

## **REMARKS**

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

### **I. DISPOSITION OF THE CLAIMS**

Claim 1 is currently being amended, claims 3 and 21 are currently being canceled, and no new claims are currently being added. Claims 16-20 are withdrawn as non-elected.

Claim 1 has been amended to conform the transition phrase to standard U.S. practice and to incorporate the limitations of claim 3 (“supercritical . . . conditions”). Claim 21 has been canceled because it depended from canceled claim 2 and merely added the identical “supercritical . . . conditions” limitation that has been incorporated into claim 1.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1, 4-20, and 22-23 are now pending in this application. Claims 1, 4-15, and 22-23 are under examination.

### **II. STATUS OF OUTSTANDING REJECTIONS**

In the outstanding final Office Action, the Office has withdrawn the anticipation rejection presented in the non-final Office Action dated November 14, 2007. The Office stated, “Applicant’s amendments to the independent claim 1 distinguish the claim and its dependent claims 2, 4-5, 7-11, and 13-15 over Chen et al.” See outstanding Office Action, page 4, lines 12-13.

The rejection of claims 1, 4-5, 7-11, and 13-15 as obvious over R. Chen et al., Materials Letters 54 (2002) 314-317 (“Chen”) and U.S. Patent No. 4,552,786 to Berneburg et al. (“Berneburg”) and the rejection of claim 23 as obvious over Chen, Berneburg, and U.S. Patent No. 5,523,065 to Stangle et al. are obviated by the present amendment of claim 1.

Claim 1 as amended incorporates the limitations of claim 3 (“wherein the fluid containing the solvent and the precursor is maintained under supercritical temperature and pressure conditions”). Accordingly, the only rejection in the outstanding Office Action considered relevant to the pending claims is the rejection of claims 3, 6, 12, and 21-22 (i.e., the claims that included the “supercritical. . . conditions” limitations) as obvious over Chen in view of Berneburg. The following arguments address the reasoning of this rejection.

### **III. CLAIMS 1, 4-15, AND 22-23 ARE NONOBVIOUS OVER CHEN AND BERNEBURG**

Applicants have concurrently filed a Declaration under 37 C.F.R. § 1.132 executed by co-inventor Cyril Gérard Jacques Aymonier. The Declaration provides sworn testimony regarding the disclosures of Chen and Berneburg.

Specifically, the Declaration asserts that a person of ordinary skill in the field of coating ceramic powder reviewing Chen and Berneburg would have concluded that Chen discloses no clear evidence of the structure of the obtained material, that Chen and Berneburg solve different problems, that Chen and Berneburg disclose nonequivalent processes, and that the method of Chen would not work under supercritical conditions.

The Supreme Court states the standard for determining obviousness as follows (*KSR v. Teleflex*, 550 U.S. \_\_\_, 127 S. Ct. 1727 (2007) (quoting *Graham v. John Deere Co. of Kansas City*, 383 U. S. 1, 17-18 (1966)):

Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined.

The Office rejected the claims as obvious over Chen and Berneburg based on erroneous factual findings regarding (1) scope and content of the prior art and (2) differences between the prior art and the claims. As evidenced by the attached Aymonier Declaration, the Office has misinterpreted the content of Chen and Berneburg by mischaracterizing various disclosures therein, and the Office has failed to recognize a key difference between the Chen

reference and the claimed invention, i.e., that Chen does not conclusively demonstrate a silica coating on its disclosed particles.

**A. Chen's Method Is Inoperable Under Berneburg's Supercritical Conditions**

The Office stated that "The fact that Chen does not contemplate using a supercritical fluid to assist in precision precipitation of the ceramic precursor does not mean that doing so would not constitute an improvement on the process, and that one of ordinary skill would not recognize this improvement." Office Action, page 2, lines 2-5 from the bottom. The Office further stated that "no detrimental effects would be expected by using supercritical conditions with fluid containing the solvent and precursor". Office Action, sentence bridging pages 8-9.

To the contrary, the Aymonier Declaration states that "Chen's method would not work as intended under supercritical conditions" (emphasis in original; Declaration, page 4, paragraph 19). Chen discloses a method meant to coat particles of BaTiO<sub>3</sub> with silica (see Abstract). The Aymonier Declaration states that "NaSiO<sub>3</sub> is nearly insoluble in supercritical water (water above 374°C and 221 bars). So it is impossible to coat the barium titanate particles with silica according to the method of Chen". See Declaration, page 4, paragraph 20).

Moreover, the Aymonier Declaration states that the "Berneburg supercritical fluid is incompatible with Chen's method" (emphasis in original; Declaration, page 5, paragraph 21). The Aymonier Declaration states that while "Chen requires specific chemical reactions between the barium titanate and the silica precursor in order to form a coating layer over the particles" the Berneburg method involves no such reactions and merely traps the precursor into the ceramic body's pores. See Declaration, page 5, paragraph 22.

Due to the fundamental technical incompatibilities between the Chen and Berneburg methods, using the Berneburg method to coat Chen's barium titanate particles would yield "a blend of barium titanate particles and initial silica precursor, because there would be no possible chemical reaction between the compounds" (Declaration, page 5, paragraph 24).

Therefore, the Office's factual findings regarding "an improvement in the process" and "no detrimental effects" are erroneous.

**B. Chen discloses no clear evidence of the structure of the obtained material**

The Office states, "the obvious modification of Chen et al in view of Berneburg et al would lead to a process meeting all of the limitations of the newly amended claim 1."

To the contrary, the combination of Chen and Berneburg fails to satisfy the limitation "coating particles of a ferroelectric compound with a layer of a dielectric", because this feature is lacking in Chen.

The Aymonier Declaration states that Chen provides no conclusive evidence that a silica coating formed on the particles. Chen states that Figure 1 reveals a "homogeneous silica film" on particles, but the Aymonier Declaration states that "it cannot be concluded with certainty from Figure 1 that the method disclosed by Chen leads to barium titanate particles coated with silica" and the particles could be coated with  $\text{TiO}_2$ . Declaration, paragraph 8, bridging pages 2-3. Also, the Aymonier Declaration states that Figure 2, which allegedly shows energy dispersion spectrometry analyses confirming the presence of silica on the powder, is actually inconclusive and could merely reveal "separate particles of barium titanate and silica". Declaration, page 3, paragraph 8.

The record evidence, in the form of the Aymonier Declaration, thus shows that a person of ordinary skill in the art would not recognize the claimed feature of "coating particles of a ferroelectric compound with a layer of a dielectric" in Chen. Berneburg cannot cure this deficiency, because Berneburg does not relate to particles.

On this basis, the obviousness rejection is erroneous and should be withdrawn.

**C. Chen And Berneburg Solve Different Problems**

The Office asserted that "porous ceramics and ceramic powders can be considered analogous for the purposes of infiltrating fluid because they are both ceramic bodies separated by spaces to be filled." Office Action, page 8, lines 2-4 from the bottom.

The Aymonier Declaration indicates that the Chen and Berneburg are not analogous because these references address different problems. The Declaration states that “Berneburg seeks to fill pores inside a ceramic body” which leads to problems of surface plugging and sealing-off of pores at the surface of the ceramic body, while Chen faces no comparable problems because “Chen seeks to coat surfaces that are fully exposed and easily reached with coating solution”. Declaration, page 3, paragraphs 10-11.

Consequently, the Office mischaracterized the Chen and Berneburg processes as analogous, and the source of motivation (solving a similar problem) cited by the Office does not exist.

**D. Chen And Berneburg Disclose Nonequivalent Processes**

The Office stated, “Depositing a precursor from a solution into ceramic pores is an equivalent physical process to precursor deposition onto ceramic particles.”

The Aymonier Declaration flatly contradicts this assertion. Declaration, pages 3-4, paragraphs 12-15. Specifically, the Declaration states, “Precursor deposition onto ceramic particles is much simpler than coating interior pores of a ceramic body, because pore penetration is unnecessary for deposition onto ceramic particles” and while “Berneburg discloses that supercritical conditions enhance infiltration in submicron sized pores”, Berneburg does not indicate that precipitation is enhanced by supercritical conditions. Declaration, page 4, paragraphs 14-16.

Consequently, the deposition processes of Chen and Berneburg are not equivalent.

**CONCLUSION**


Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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